mate of 90%; these are statistically close enough, given the differences in our methods and the systems we analyzed, to strongly suggest the true rate is in the vicinity of perhaps 75% to 95%. With regard to associated reductions in cost, these will vary from place to place, and our estimate for Los Angeles cannot be automatically extrapolated to other environments with different configurations to their prehospital systems.

As we noted in our discussion, we think a system that relies primarily on off-line medical control (which is very different from a "discretionary system") offers tremendous potential advantages, including, ultimately, closer and more reliable supervision of paramedics than on-line systems. This does require, of course, as Davidson and Erder agree, a carefully constructed computer-based method of identifying any paramedic deviation from protocol.

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Lyme Disease Surveillance in California

TO THE EDITOR: Lyme disease is the leading tick-borne infection in California. Its frequency and location are difficult to assess, however. Lyme disease support groups and the media overestimate its frequency of occurrence. Conversely, the Centers for Disease Control (CDC) and the California Department of Health Services' (CDHS) figures for Lyme disease are misleadingly low. Official figures for California list 182 cases in 1987. The CDC had no tabulation for 1988 and 232 cases of Lyme disease in 1989.[1]

In contrast, a Northern California Lyme Disease Study* recorded 322 clinical cases in 1988 and 527 cases in 1989. Of these cases, 90% were reported from the counties north of the San Francisco Bay. This collaborative education and surveillance study was conducted with 501 participating office-based physicians in the 16 north Coastal Range counties of California, the major California locus of the transmitting tick vector, *Ixodes pacificus*. These physicians were sent the then-current CDC case definition of Lyme disease, ongoing current clinical review articles, literature abstracts, and interviews with Lyme disease experts. At the end of 1988 and 1989, a simple postcard report form was returned by 368 physicians. The clinical diagnosis of the treating physicians was accepted as the case definition for this study.

The low public health figure reflects surveillance before Lyme disease became a reportable disease in California in March 1989. Lyme disease will continue to be underestimated both in California and in other states using the CDC case definition, for several reasons:

- Physicians will not complete the required two-page CDC report form to report a basically noncontagious disease. This conclusion is reinforced by the experience of the Northern California Lyme Disease Study. In addition to the postcard report form, the study participants were requested to complete and return a more detailed cumulative report for their Lyme disease cases. Despite several reminders, only 167 of the 849 cases were reported on the detailed report form.
- The epidemiologic surveillance definition of the CDC for Lyme disease will exclude many clinical cases diagnosed and treated by a prudent physician. Requiring laboratory confirmation for all patients without erythema migrans ignores the vagaries of current serologic laboratory testing available to physicians in the field. Significant intralaboratory variance continues to be reported in the medical literature.[2,3] A test reported positive by one laboratory is reported negative by another laboratory. Until we have a standardized, readily reproducible test, Lyme disease will remain primarily a clinical diagnosis.

Even here, the CDC clinical criteria are so strict that any but classic manifestations will exclude many cases even with clearly positive serologic tests. In addition, the new CDC requirement of demonstrated intrathecal production of Lyme antibody will greatly reduce the reporting of a late manifestation of central nervous system Lyme disease. The laboratory testing for this is even less standardized and generally not available to physicians in the endemic areas of California. All of this can lead to the false impression that Lyme disease is a minor and lessening problem in California.

The CDHS estimate of the occurrence of Lyme disease in California would become more realistic if they would do the following:

- Accept Lyme disease reporting on the Confidential Morbidity Report form. This simple form, used for a host of other reportable diseases including far more serious ailments, would increase physician reporting compliance manyfold.
- Accept the clinical diagnosis of treating physicians as the Lyme disease case definition. This is done with a number of other reportable diseases. The CDC case definition is not mandatory and is not used in all states. Until we have an accessible gold standard test for Lyme disease, the clinical judgment of a physician who assumes responsibility for the diagnosis and treatment of a patient should remain paramount. The ubiquitous manifestations of Lyme disease make this judgment difficult. On the one hand, casual evaluation can lead to overdiagnosis and inappropriate treatment. Antibiotic treatment, both oral and intravenous, is a potent placebo. Symptomatic remission and exacerbation from this placebo effect can reinforce a false diagnosis of Lyme disease. The label of Lyme disease is difficult to remove and can delay the recognition of a correct diagnosis. Conversely, the failure to consider and test for Lyme disease can delay the proper treatment and relief of symptoms for many patients with less than classic symptoms. Lyme disease is truly the newest "great imitator."

Physicians should make the extra effort to use whatever form is required for reporting Lyme disease cases, even if they know the cases will not be counted.

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REFERENCES

1. Centers for Disease Control: Lyme disease—United States, 1987 and 1988. MMWR 1989; 38:668-672

2. Schwartz BS, Goldstein MD, Ribeiro JM, Schulze TL, Shahied SI: Antibody testing in Lyme disease: A comparison of results in four laboratories. JAMA 1989; 262:3431-3434

3. Luger SW, Kraus E: Serologic tests for Lyme disease: Intralaboratory variability. Arch Intern Med 1990; 150:761-763